

Barriers to Adoption and Limitations to EMA

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BARRIERS

- Human Subjects Factors
 - Burden & selection and response biases;
- Measurement Reactivity
 - How much, how often?
- Maturity of the technologies
 - Mature and “not ready for prime time” real-time technologies
- Economic Considerations
 - Initial & maintenance costs
- Data Overload



BARRIERS

- Conceptual
 - Sampling issues, variable sequential and inter-dependencies
- IRB Concerns
 - Unintentional collection of incriminating information; data on activities of non-consenting others; tracking of movement
- Institutional Cultures
 - Policies prohibiting pagers/beepers in schools; out of sync with peer dress codes

LIMITATIONS

- Technological

- Hardware still vulnerable to damage; battery capacities still limit the length of recording intervals.

- Statistical

- Commercial analytic software designed for the more challenging research questions not yet widely available; research designs often violate assumptions of the more commonly used statistical approaches

- Conceptual

- Lack of models characterizing psychophysiological processes or phenomena over time and the sequential dependencies of their underlying factors





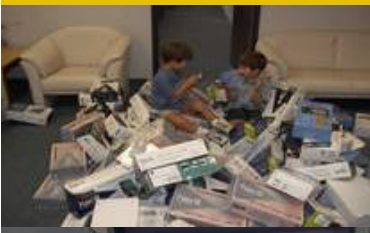
Start-up Costs: The Check Please?



- Project MASH (Monitoring of Adolescent Stress/Health)

- 170 Personal Digital Assistants (PDAs) x \$120 - \$350
- 25 Actigraphs x \$500
- 25 POLAR Heart Rate Monitors x \$400
- 5 Ambulatory Blood Pressure Monitors x \$3,500





Equipment Loss/Damage/Failure

After 4 years...

- 42% - Still in service
- 39% - Damaged BR
- 16% - Lost by Subject



Dropped from various heights
Bowling ball dropped on it
Slammed between door jam and car door
Participants brother threw object at her and hit palm
Pressing too hard on the screen
Dropped in a stream
Dropped /thrown in a pool
Sat on it
Participant pushed against wall
Dunked in sink in photo class
Most popular: "My friend did it"





Human Subject Factors

- Training of Participants
 - More time; greater selection biases
- Measurement Reactivity
 - Important but not a “deal breaker”
- Protocol Adherence/Compliance
 - Sensitive to Individual Differences Factors as well as contextual effects
 - What are we not seeing in missing reports?



Protocol Adherence



- Affected by:
 - Age
 - Gender
 - Smoking Status
 - Dispositions (e.g. delinquency, aggression)
 - Social and Environmental Contexts
- Not Affected by:
 - Sampling frequency (as high as 25x/day)



Adherence to EMA Protocols



- Overall Adherence:
 - 70-85% of prompted entries

- Age

ADHD children 8-10	86%
ADHD children 11-12	89%
Comp. Children 8-10	85%
Comp. Children 11-12	86%
Adolescents 14-17	82%
Young Adults 18-20	80%



Participant Burden Associated with Repeated Monitoring Diary Inconvenience

400
Adolescents*

Intense	9.8%
Strong	8.7%
Moderate	15.0%
Weak	15.3%
Just Not.	13.4%
None	37.6%

*140,000 entries

200
Young Adults**

Intense	14.3%
Strong	10.5%
Moderate	18.5%
Weak	15.8%
Just Not.	13.9%
None	26.8%

**50,000 entries



Measurement Reactivity & Data Representativeness

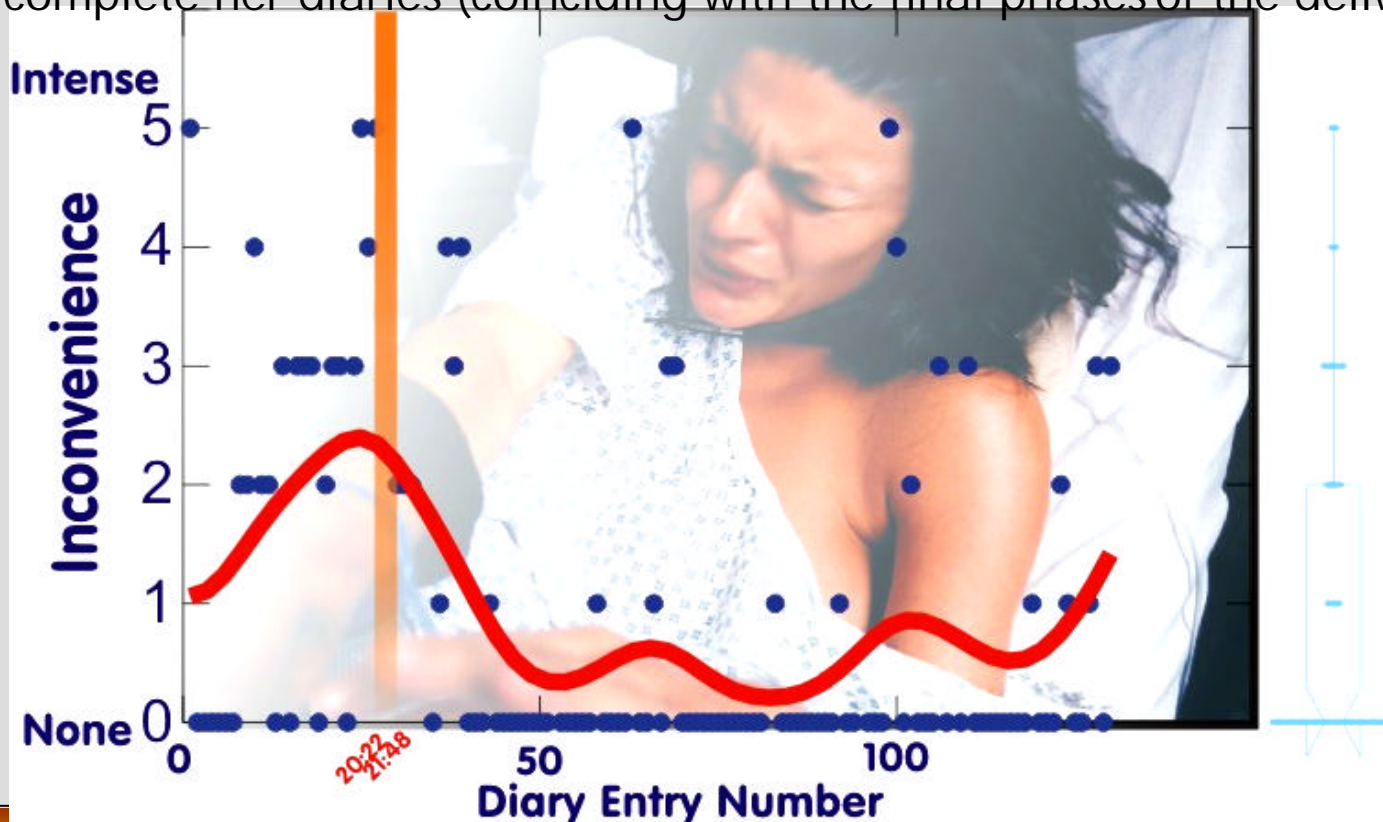


- Impact of Selective Responding on Validity
 - Whose behaviors are we modeling?
 - Are we capturing responses of the events of primary interest?
- Use of internal validity checks based on multi-method measurement strategies.
- Are all psychological phenomena or processes amenable to study using EMA?



Do EMA Protocols Impose Significant Burden Across All Participants?




Ratings of Diary Inconvenience in a Participant who gave birth during a monitoring session. Orange bar represents a 1-hr 26min "break" in which she failed to complete her diaries (coinciding with the final phases of the delivery).



Reducing Reactance & Increasing Adherence: Can Technology Minimize the Limitations Inherent to EMA Designs?










Where Am I Now?

-  Home
-  Friend's or Relative's
-  Event
-  Car / Bus
-  Work or School
-  Somewhere Else



Next->

What Was I Doing?

-  Getting Child Ready
-  Homework w/ Child
-  Work: Lesson/ Practice
-  Computer Games
-  Playing/Games
-  TV or Music
-  NEXT




Next->

I AM: ALONE?

-  I'm by MYSELF
-  I'm WITH SOMEONE

Next->

WE ARE:

-  GETTING ALONG
-  DISAGREEING
-  HAVING FUN

Next->

Diary Design



**Right Now I'm: FRUSTRATED/
ANGRY**



YES



SORTA



NO

Next->

**Right Now I'm: SAD/
DISCOURAGED**



YES



SORTA



NO

Next->

Breaking Barriers...



"That it will ever come into general use, notwithstanding its value, is extremely doubtful because its beneficial application requires much time and gives a good bit of trouble, both to the patient and to the practitioner because its hue and character are foreign and opposed to all our habits and associations."



The Source: The London Times, 1834

The Subject: The stethoscope



The Future

